CONCEPTUAL DESIGN PLAN – TEAM 21

Design Scheme 1

“Bridging Generations · Water and Warmth”

Elderly–Youth Mutual Aid Network + Ergonomic Water Dispenser Cradle

I. Project Positioning and Core Objectives

This project aims to strengthen intergenerational bonds by addressing a practical challenge faced by the elderly — the difficulty of lifting heavy water bottles.
Through the creation of a WeChat community, one of the most popular social media platforms in China, the proposal establishes a local mutual aid network connecting young volunteers and elderly residents.

Young participants deliver bottled water directly to the homes of elderly people, who in return offer small gifts such as homemade food or vegetables from their gardens.
Inside the home, an ergonomic cradle dispenser allows seniors to pour water without lifting the bottle, combining functional support with social connection.

The overall goal is to reduce physical strain while fostering genuine emotional exchange between generations.

II. Elderly-Friendly Facility Design

2.1 Social Interaction Platform – WeChat Community “Water & Warmth”

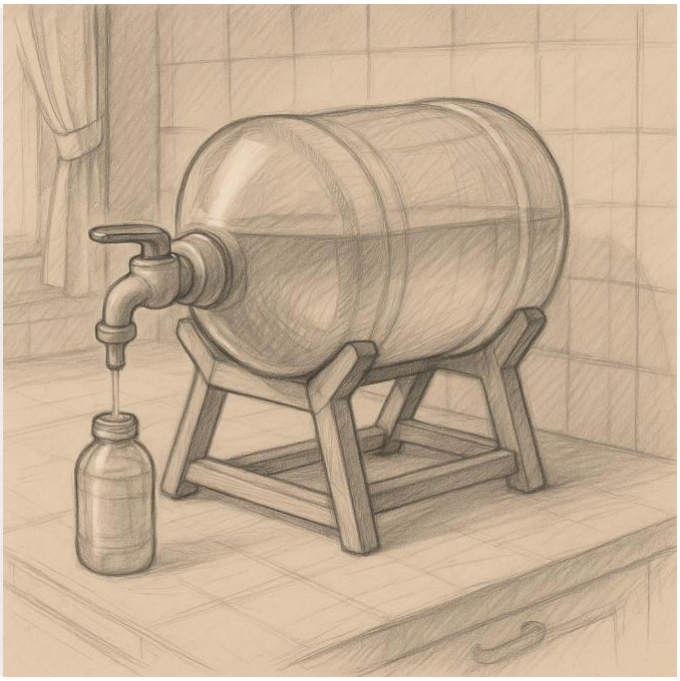
- A local WeChat group links young volunteers with elderly residents in the same neighborhood.
- Volunteers register as “Water Helpers”, specifying availability and coverage areas.
- Seniors can request help simply by sending a voice message or tapping a simple icon.
- The group also hosts light community activities — recipe sharing, photos of gardens, wellness tips — to strengthen trust and connection.

2.2 Ergonomic “Water Cradle” System

- Structure: lightweight steel frame + reinforced plastic base, with a non-slip surface and 30° tilt angle.
- The bottle rests in a rocking cradle that reduces perceived weight and allows easy pouring.
- A lever-type spout replaces the original cap, enabling effortless dispensing even for users with weak grip strength.
- Optimal height: 60 cm, designed for comfortable use while seated.

III. Core Highlights and Expected Outcomes

1. Two-way social support: young volunteers help with deliveries, while the elderly share appreciation and local wisdom.
2. Ergonomic simplicity: reduces strain and adapts to seniors' limited mobility.
3. Community engagement: digital tools serve as bridges between generations, not barriers.
4. Scalable model: adaptable to other urban communities or cultural contexts.



Hypothetical budget for wooden bottle holder → €80

Design Scheme 2

“Shared Water · Shared Care”

Collective Water Storage Lockers for Residential Buildings

I. Project Positioning and Core Objectives

This proposal addresses the daily challenge of accessing heavy bottled water for elderly people living alone in multi-story buildings.
Instead of carrying large containers upstairs, the system introduces collective water lockers — modular storage units managed by local water suppliers.

Each apartment has its own secure compartment where full containers are delivered and replaced regularly. Seniors can then refill smaller bottles as needed, minimizing effort and risk.

II. Facility and Functional Design

2.1 Collective Water Locker System

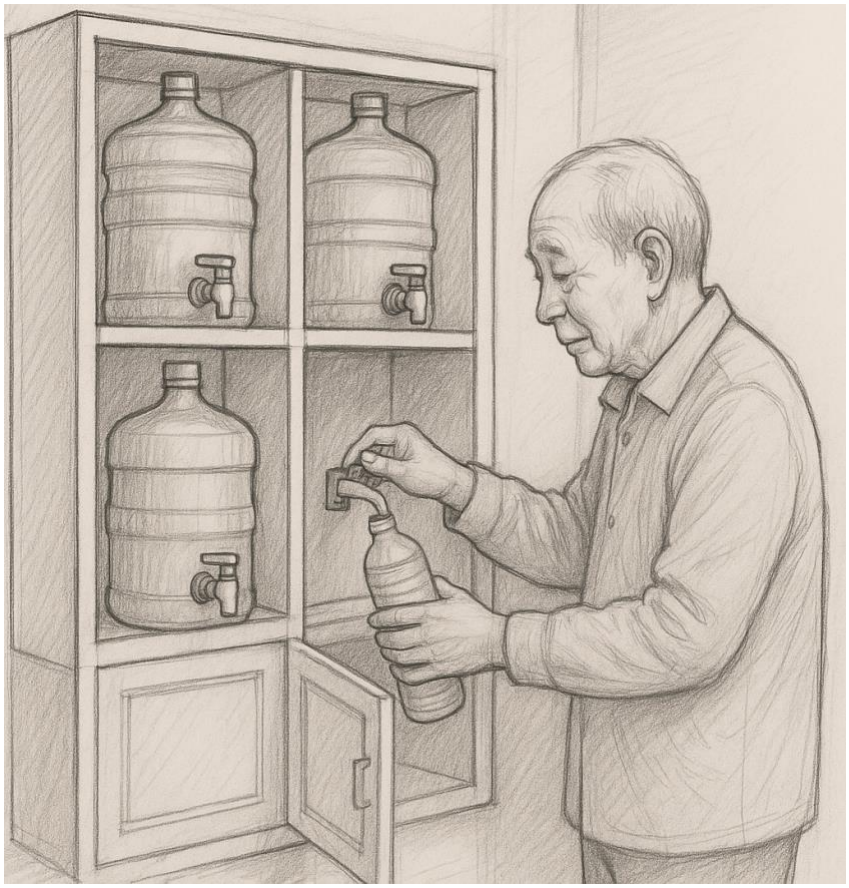
- Modular galvanized steel structure with numbered compartments for each apartment.
- Each locker is locked via key or magnetic code and contains a 10–20 L tank.
- Water suppliers replace or refill tanks weekly, ensuring constant availability.

2.2 Accessibility and User Experience

- Maximum height: 120 cm for easy reach and safe posture.
- Tilted faucet (30°) allows convenient bottle refilling.
- Automatic lighting activates upon door opening for visibility.
- Large-type illustrated instructions assist users with limited vision.

III. Core Highlights and Expected Outcomes

1. Zero physical strain: eliminates the need to lift or carry heavy bottles.
2. Efficient shared management: integrates directly with supplier delivery systems.
3. Improved safety: reduces fall and injury risks in the home environment.
4. Inclusive cohousing model: promotes aging-in-place through practical and caring design.



Hypothetical budget → 520€

Design Scheme 3

"MonoLift Pro"

Stair-Climbing Trolley + Mobile Raised-Base Water Station (All-in-One)

I. Project Positioning and Core Objectives

Many individuals living in multi-level homes struggle with transporting and using heavy 18–19 kg water bottles. The primary issues are:

- Physical strain while climbing stairs
- Risk of injury while lifting heavy bottles
- Limited indoor space for storage and use
- Repetitive daily lifting required for water dispensing

"MonoLift Pro" introduces a single, integrated solution that merges ergonomic mobility with at-home usability:

1. A stair-climbing trolley that reduces upward transport effort.
2. A built-in raised platform that turns the trolley into an indoor dispensing station.
3. Integrated securing straps to keep the bottle stable at all times.
4. A wheel-locking system for safe use inside the home.

The objective is to provide a compact, mobile, and lift-free system that handles water transport and daily dispensing with minimal physical effort.

II. Compact Mechanical & Mobile Design

2.1 Stair-Climbing Trolley Transport System

Key components:
• Lightweight reinforced aluminum frame
• Tri-star wheel clusters for stair climbing
• Telescoping handle with ergonomic grip
• Dual-mode wheel system (stair wheels + indoor wheels)
• Integrated quick-buckle elastic straps
• Rear brake system for stability

Functioning principle:

- The tri-star wheels rotate around the stair edges, greatly reducing the perceived weight.
- The user pulls the trolley upward instead of lifting the bottle.
- Once on flat ground, the trolley switches into "house mode," rolling like a regular 4-wheel indoor cart.

Ideal performance specs:
• Minimum load capacity: 40–60 kg
• Stair wheel diameter: 12–16 cm
• Indoor wheel diameter: 6–8 cm
• Foldable handle for compact storage

2.2 Integrated Raised Base — Everyday-Use Platform

The defining feature of MonoLift Pro is the built-in elevated platform (20–28 cm from the ground), allowing users to dispense water comfortably without bending or lifting.

Platform components:
• Anti-slip surface with concave center to fit bottle base
• Raised edge guardrail to prevent sliding
• Side opening for electric water pump cables/tubing
• Reinforced metal support frame
• Shock-absorbing pads beneath the platform

Purpose:

- Eliminates the need for a separate stand or table
- Positions the bottle at ideal height for dispensing
- Supports electric USB water pumps for effortless daily use

2.3 Transformable Modes — How the System Works

1. Load Mode
   The water bottle is placed on the built-in raised base. Integrated straps hold it firmly in position.
2. Stair-Climbing Mode
   The trolley is tilted backward. Tri-star wheels engage and climb the stairs with reduced effort.
3. Indoor Mobility Mode
   Once inside, the trolley is tilted forward:
   → The flat indoor wheels engage
   → The system becomes a normal push-cart
4. Dispensing Mode
   Wheel brakes engage.
   The raised platform acts as a stable water station with pump access.

III. Core Highlights and Expected Outcomes

1. Zero lifting in both phases:
   - No lifting for stair transport
   - No lifting for daily water dispensing
2. All-in-one solution:
   - One device replaces a separate trolley, stand, and base
3. Compact and space-saving:
   - Narrow frame, foldable handle, ideal for small homes
4. High mobility:
   - Moves easily from kitchen to balcony to living room
5. Safety:
   - Integrated straps, brake system, anti-slip base
6. Accessibility:
   - Ideal for users with limited strength, joint pain, or mobility restrictions
7. Cost-efficient and maintenance-free:
   - Mechanical assistance + optional USB pump
   - No installation required

IV. Budget and Future Potential

Estimated Budget Range

€200–350, based on:

- Stair-climbing wheel system
- Reinforced aluminum frame
- Built-in raised platform
- Dual-wheel indoor mobility
- Integrated strap system
- Brake components

A premium version with built-in electric pump integration would remain under €450.

Future expansion options:

• Smart water-level sensor
• Automatic pump integration
• Modular add-on baskets
• Recyclable or ultra-light frames

MonoLift Pro can evolve into a specialized accessibility product, ideal for compact homes, seniors, small businesses, or anyone managing heavy water loads.